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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/709,301	04/27/2004	Daniel J. Farrar	SYB/0099.01	3300
31779	7590	11/01/2007		
JOHN A. SMART 708 BLOSSOM HILL RD., #201 LOS GATOS, CA 95032-3503			EXAMINER GORTAYO, DANGELINO N	
			ART UNIT	PAPER NUMBER
			2168	
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			11/01/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/709,301	FARRAR ET AL.	
	Examiner	Art Unit	
	Dangelino N. Gortayo	2168	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 August 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 3-24 and 26-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3-24, and 26-45 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/19/2007 has been entered.

Response to Amendment

2. In the amendment filed on 8/13/07, claims 1 and 24 has been amended. The currently pending claims considered below are Claims 1, 3-24, and 26-45.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 3-24, 26-45 are rejected under 35 U.S.C. 102(e) as being anticipated by Brown et al. (US Publication 2003/0093408)

As per claim 1, Brown teaches “In a database system including a database optimizer normally used for generating an access plan for processing a given database query run against the database system, an optimizer-based method for recommending database indexes to be created for maximizing system performance, the method comprising:” (see Abstract)

“capturing a workload representative of database queries employed during prior database system use,” (paragraphs 0050, 0052, 0054, 0142, wherein a workload that includes a set of queries in a database system is stored)

“monitoring the database optimizer as it prepares to optimize each of the queries, by recording all potential database physical indexes which do not currently exist in the database and for which the database optimizer searched during a preoptimization phase that occurs prior to access plan generation,” (paragraph 0048, 0049, 0056, wherein potential recommended indexes are identified and represented visually)

“creating an initial set of virtual indexes each simulating presence of a class of potential database physical indexes that were recorded during said monitoring step,” (paragraph 0046, 0075, 0076, 0077, wherein INITIATE INDEX ANALYSIS specifies a list of indexes for recommendation) “wherein each said virtual index comprises an in-memory data structure corresponding to a set of potential database physical indexes;”

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(paragraphs 0082, 0113, 0114, 0117, 0126, 0129, 0130, 0131, wherein index recommendations are in a table that needs validation before application)

“computing cost benefits for different subsets of the set of virtual indexes by invoking the database optimizer again for purposes of providing cost estimates for the workload for each such subset, progressively eliminating a fixed percentage of virtual indexes with the lowest expected improvement in the query’s estimated cost from consideration until space that would be occupied by the virtual indexes is less than or equal to a user-specified value;” (paragraphs 0079, 0126, 0127, 0128, wherein the index wizard server module calculates cost analysis of recommended indexes)

“and recommending database physical indexes to be created based on those virtual indexes that have favorable estimated cost benefits for the captured workload and have not been eliminated from consideration.” (paragraph 0050, 0080, 0081, 0082, 0130, 0135, wherein index recommendations are made to a user)

As per claim 3, Brown teaches “the capturing step includes: displaying a screen input button that a user may invoke to record a usage session as a workload.” (Figures 15, 22, 23, paragraph 0052, 0223, 0225, 0226)

As per claim 4, Brown teaches “the workload represents user execution of a database application with a typical workload that is contemplated for the application.” (paragraphs 0050, 0052)

As per claim 5, Brown teaches “the workload includes information recording text of all the queries operating during the capture of the workload.” (paragraphs 0052, 0142)

As per claim 6, Brown teaches “the workload includes information recording settings for certain options that affect how queries are optimized.” (paragraphs 0142, 0230)

As per claim 7, Brown teaches “the capturing step includes: capturing information about a set of workloads to define a problem instance.” (paragraphs 0052, 0221, 0230)

As per claim 8, Brown teaches “ setting a limit on how much disk space is available for physical indexes.” (paragraphs 0117, 0186)

As per claim 9, Brown teaches “the recommending step takes into account the limit on disk space available for physical indexes.” (paragraphs 0186, 0188)

As per claim 10, Brown teaches “the recommending step includes: if the physical indexes to be recommended for creation exceed the limit on disk space available for physical indexes, removing some of the physical indexes from consideration.” (paragraph 0158, 0186)

As per claim 11, Brown teaches “the physical indexes removed from consideration are ones having less favorable cost benefits for the captured workload.” (paragraph 0158, 0186)

As per claim 12, Brown teaches “the physical indexes removed from consideration comprise at least 20 percent of bottom performing indexes considered for recommendation.” (paragraphs 0128, 0195, 0245)

As per claim 13, Brown teaches “specifying whether certain types of indexes should be considered at all.” (Figure 28, paragraph 0154, 0155, 0158)

As per claim 14, Brown teaches “the creating virtual indexes step includes: searching for relevant indexes that will help the system's optimizer use sargable predicates for partial index scans.” (Figure 28, paragraphs 0158, 0173, 0178)

As per claim 15, Brown teaches “an index consultant creates virtual indexes without specifying ordering of columns used in sargable equality predicates.” (Figure 28, paragraphs 0158, 0173, 0178)

As per claim 16, Brown teaches “the creating virtual indexes step includes: searching for relevant indexes that will help provide useful orderings.” (paragraphs 0173, 0175, 0188)

As per claim 17, Brown teaches “columns of virtual indexes may be order-independent “don't care” columns that satisfy some interesting ordering wish list of the system's optimizer.” (paragraphs 0187, 0197)

As per claim 18, Brown teaches “columns of virtual indexes may have an unspecified sortedness.” (paragraphs 0187, 0197)

As per claim 19, Brown teaches “collapsing some of the virtual indexes together, if feasible for the workload.” (paragraphs 0176, 0188)

As per claim 20, Brown teaches “the collapsing step includes: identifying that columns of one virtual index are a superset of another the columns of another virtual index, and that both indexes may be combined into a single virtual index that is feasible for the workload;” (paragraphs 0176, 0184, 0185)

“and identifying that sortedness of a column of a virtual index, if unspecified, may be specified to allow it to be combined with an index with identical columns but specified sortedness;” (paragraphs 0188)

“and identifying that a virtual index that has columns of opposite sortedness of a second virtual index, and that both indexes may be combined into a single virtual index.” (paragraphs 0266, 0267, 0268, 0269)

As per claim 21, Brown teaches “polling periodically in the method to ensure that the system is working with accurate cost information.” (paragraph 0048, 0049, 0056)

As per claim 22, Brown is disclosed as per claim 1 above. Additionally, Brown teaches “A computer-readable medium having processor-executable instructions” (paragraphs 0272)

As per claim 23, Brown is disclosed as per claim 1 above. Additionally, Brown teaches “A downloadable set of processor-executable instructions” (paragraph 0273)

As per claim 24, Brown teaches “A system that recommends database indexes to be created for optimizing system performance, the system comprising:” (see Abstract)

“a database system that executes database queries, said database system having an optimizer for generating an access plan for processing each given database query;” (paragraphs 0044, 0048, 0049, 0056, wherein access plans are generated for queries)

“and an optimizer-based index consultant for capturing a workload representative of database queries executed during typical system use;” (paragraphs 0050, 0052, 0054, 0142, wherein a workload that includes a set of queries in a database system is stored)

“creating, based on indexes sought by the optimizer during generation of access plans for said database queries, virtual indexes for optimizing system performance during execution of the database queries captured in the workload,” (paragraph 0046, 0075, 0076, 0077, wherein INITIATE INDEX ANALYSIS specifies a list of indexes for recommendation) “wherein each said virtual index comprises an in-memory data structure corresponding to a set of potential physical indexes;” (paragraphs 0082, 0113, 0114, 0117, 0126, 0129, 0130, 0131, wherein index recommendations are in a table that needs validation before application)

“computing cost benefits for different combinations of the virtual indexes by re-optimizing the workload multiple times, each time eliminating less-beneficial indexes from consideration”. (paragraphs 0079, 0126, 0127, 0128, wherein the index wizard server module calculates cost analysis of recommended indexes)

“and recommending physical indexes to be created based on virtual indexes that have favorable cost benefits for the captured workload.” (paragraph 0050, 0080, 0081, 0082, 0130, 0135, wherein index recommendations are made to a user)

As per claim 26, Brown teaches “the index consultant displays a screen input button that a user may invoke to record a usage session as a workload.” (Figures 15, 22, 23, paragraph 0052, 0223, 0225, 0226)

As per claim 27, Brown teaches “the workload represents user execution of a database application with a typical workload that is contemplated for the application.” (paragraphs 0050, 0052)

As per claim 28, Brown teaches “the workload includes information recording text of all the queries operating during the capture of the workload.” (paragraphs 0052, 0142)

As per claim 29, Brown teaches “the workload includes information recording settings for certain options that affect how queries are optimized.” (paragraphs 0142, 0230)

As per claim 30, Brown teaches “the index consultant captures information about a set of workloads to define a problem instance.” (paragraphs 0052, 0221, 0230)

As per claim 31, Brown teaches “ the index consultant may receive information specifying a limit on how much disk space is available for physical indexes.” (paragraphs 0117, 0186)

As per claim 32, Brown teaches “the index consultant takes into account the limit on disk space available for physical indexes.” (paragraphs 0186, 0188)

As per claim 33, Brown teaches “the index consultant removes some of the physical indexes from consideration, when sufficient disk space is unavailable.” (paragraph 0158, 0186)

As per claim 34, Brown teaches “the physical indexes removed from consideration are ones having less favorable cost benefits for the captured workload.” (paragraph 0158, 0186)

As per claim 35, Brown teaches “the physical indexes removed from consideration comprise at least 20 percent of bottom performing indexes considered for recommendation.” (paragraphs 0128, 0195, 0245)

As per claim 36, Brown teaches “the index consultant allows user input specifying whether certain types of indexes should be considered at all.” (Figure 28, paragraph 0154, 0155, 0158)

As per claim 37, Brown teaches “the index consultant searches for relevant indexes that will help the system's optimizer use sargable predicates for partial index scans.” (Figure 28, paragraphs 0158, 0173, 0178)

As per claim 38, Brown teaches “the index consultant creates virtual indexes without specifying ordering of columns used in sargable equality predicates.” (Figure 28, paragraphs 0158, 0173, 0178)

As per claim 39, Brown teaches “the index consultant searches for relevant indexes that will help provide useful interesting (order or grouping) properties.” (paragraphs 0173, 0175, 0188)

As per claim 40, Brown teaches “columns of indexes created may reflect order-independent “don't care” columns that satisfy some interesting ordering wish lists of the system's optimizer.” (paragraphs 0187, 0197)

As per claim 41, Brown teaches “the index consultant attempts to collapse some of the virtual indexes together, if feasible for the workload.” ((paragraphs 0176, 0188)

As per claim 42, Brown teaches “the index consultant attempts to identify that columns of one index are a superset of the columns of another index, and that both

indexes may be combined into a single index that is feasible for the workload.”
(paragraphs 0176, 0184, 0185)

As per claim 43, Brown teaches “operation of the index consultant may be polled during operation to ensure that the system is working with accurate cost information.” (paragraph 0048, 0049, 0056)

As per claim 44, Brown teaches “the virtual indexes are created by an index consultant that observes the optimizer's need for certain indexes during generation of access plans for said database queries.” (paragraphs 0043, 0078, 0238)

As per claim 45, Brown teaches “the index consultant creates the virtual indexes by observing the optimizer's need for certain indexes during generation of access plans for said database queries.” (paragraphs 0043, 0078, 0238)

Response to Arguments

5. Applicant's arguments with respect to the rejection of claims 1, 3-24, 26-45 under 35 USC 103(a) have been considered but are moot in view of the new ground(s) of rejection. Amendments to the claims necessitated new grounds of rejection.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Grasshoff et al. (US Patent 7,047,231 B2)

Agrawal et al. (US Publication 2004/0260684 A1)

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dangelino N. Gortayo whose telephone number is (571)272-7204. The examiner can normally be reached on M-F 7:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim T. Vo can be reached on (571)272-3642. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Dangelino N. Gortayo
Examiner



Tim T. Vo
SPE



TIM VO
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100